1850MNRAS..10..168C

Ephemeris of Petersen's Comet for 0h *M.T. Berlin.*[*]

By M. R. Schumacher.

	R.A.	S. Decl.	Log. Δ.	Log. r.
	° ′	° ′		
Sept. 21	194 46	68 44	0·1545	0·1594
25	195 16	70 34	0·1712	0·1715
29	195 56	72 23	0·1869	0·1837
Oct. 3	196 48	74 11	0·2015	0·1957
7	197 50	75 59	0·2153	0·2076
11	199 9	77 47	0·2282	0·2194
15	200 52	79 35	0·2405	0·2310
19	203 9	81 24	0·2522	0·2424
23	206 28	83 13	0·2634	0·2536
27	211 54	85 2	0·2740	0·2646
31	222 48	86 47	0·2843	0·2753

On a Method of finding the Effect of the Difference of Parallax, at different Places, upon the Time of Disappearance and Reappearance of a Star occulted by the Moon. By the Rev. Temple Chevallier.

The author treats the theory of occultations by supposing a line to be drawn from the centre of the earth to the star, and drawing a plane perpendicular to this line, and projecting upon this plane the disk of the moon and the place of the point of observation on the earth at the instant of disappearance or reappearance at one station: the position of the place being defined by rectangular co-ordinates, and the form of the projection of disk being defined by an equation between rectangular co-ordinates. At the station for which the occultation has been computed the co-ordinates satisfy that equation, or the projection of that station is on the circumference of the circle which is the projection of the moon. For another station the projection is not on the circumference of the circle, and the difference of the absolute times of occultation will depend on the distance of its projection from the circle. The author then has recourse to a graphical method: he lays down, by means of the elements in the *Nautical Almanac*, the places of the star on the moon's limb at disappearance and reappearance; by applying to these the computed differences of projections of the two stations, he obtains the apparent positions of the star at the same instants, as seen from the other station; then joining these by a straight line, and assuming that the apparent path of the star will

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[*] An ephemeris for the same time, but with earlier elements, was calculated by M. Sonntag, and sent some weeks ago by Professor Schumacher to the Astronomer Royal for Mr. Maclear's use.

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be in that line, and will be described with a uniform velocity such as would carry it between the *Nautical Almanac* places of disappearance and reappearance in the *Nautical Almanac* duration, those parts of the straight line which are intercepted between the apparent positions of the star and the moon's limb serve for measures (approximately) of the time which must yet elapse before the phenomenon takes place, or which has elapsed since it took place, at the second station.

On a Graphical Mode of Computing the Excentric Anomaly.

By J. J. Waterston, Esq.

The equation expressing the relation between excentricity (e), the mean anomaly φ, and the difference between the mean and excentric anomalies x, being $x = e \sin(\varphi + x)$, or $\sin(\varphi + x) = \frac{1}{e} \cdot x$, Mr. Waterston graphically solves this equation by means of the curve of sines.

Having drawn this curve, the unknown ordinate is evidently a known multiple $\left(\frac{1}{e}\right)$ of the difference between the known abscissa (φ) and the unknown abscissa ($\varphi + x$). Hence it is found by drawing a line from the extremity of φ inclined to the axis at an angle whose tangent is $\frac{1}{e}$.

The accuracy with which the value of $\varphi + x$ is determined will depend on the accuracy with which the curve is drawn, and also upon the scale to which it is drawn. If the radius be 8 inches it can with ease be read off to within 5′.

When a value of x has been obtained from the scale, it can be corrected by computation. Thus, since

$$e = \frac{x}{\sin(\varphi + x)},$$

if the approximate value of x, determined from the scale, be substituted, an error of e will be obtained, and the corresponding error of x will be found by differentiating the equation with regard to x.

The author shows also how this correction may be obtained by a simple construction, and how the method of graphical projection may be applied conveniently in extreme cases, when the mean anomaly is small and the excentricity great.

A diagram is annexed, exhibiting the curve and scales, with the construction for a given case.

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